REMARKS/ARGUMENTS

Statement of the Substance of the Interview

The undersigned attorney thanks the examiner for extending the courtesy of conducting a telephonic interview on 20 October 2009. In addition to the undersigned and the examiner, inventors Brad Myers and Jacob Wobbrock were present on the call.

An argument was presented that amended claim 1 defines over the prior art reference to Wu et al. (WO 00/72300 or US 2003/0006956) (hereinafter "Wu"). That argument is reproduced below. Claim 17 and U.S. Patent No. 4,159,471 to Whitaker were also discussed, and that discussion is reproduced below. Additional arguments in favor of the patentability of claim 17, not presented during the interview, are also presented below.

Support for the Amendments to Claims

Claims 1, 33, and 38 have been substantially amended to define over Wu. Support for the various amendments to those claims is as follows. The description of the path made within the confining geometric shape finds support in at least paragraphs [0029] and [0030] of the application as filed. Support for the "less than the input device's total area" limitation is found, for example, in figure 1. The "searching" and "identifying" limitations find support in at least paragraph [0052] and figure 9 of the application as filed.

Claims 13 and 16 have also been amended. Claims 30 and 32, claims 50 and 53, and claims 66 and 69, respectively, have been similarly amended. Support for the amendments can be found in at least paragraphs [0045] – [0047] of the application as filed.

Rejections Under § 102

In paragraph 3 of the Office action, independent claims 1, 33, and 38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Wu. It is submitted that the present invention as set forth in independent claims 1, 33, and 38 is directed to a gestural

system which receives continuous path data made by traversing edges and diagonals and into corners within a confining geometric shape constraining an input device to less than the input device's total area. That input scheme is different from Wu, which in the preferred embodiment uses four input switches. Wu does not disclose a confining geometric shape constraining an input device to less than the input device's total area. Applicants' gestural system allows users to generate characters by traversing a continuous path often times resembling the character to be generated. Wu does not provide for input of that type. The continuous path data is queued and used to determine a sequence of corner hits where the corner hits correspond to a corner defined by the confining geometric shape. It is this sequence of corner hits from which the character is identified, independently of the remainder of the continuous path data. Thus, users who input wobbly lines, arcs, or other types of strokes which would be difficult if not impossible for a pattern recognizer to recognize, are not a problem for the present invention. Furthermore, use of the confining geometric shape helps to constrain the input provided by the user. In that manner, a benefit of the gestural system (easily remembered paths) is maintained while discarding that data (the path between corner hits) which is often problematic.

Wu does not have a "queuing continuous path data" step in his preferred embodiments and does not need to search "the queued continuous path data to generate a sequence of corner hits" because in Wu, only the corners are input by pushing or touching the keys 20 on input device 12. For example, Figs. 2a-2f represent the strokes interpreted by the computer based on a path a person's finger or thumb travels between the discrete input keys 20. This is clearly disclosed in Wu, paragraphs [0027] and [0028] of the published U.S. application, as follows:

> [0027] In operation, if a user wishes to input a left-right horizontal stroke, the user moves his or her thumb horizontally across key1 and key2. <u>The signal that key1 and key2 have been consecutively visited in a particular sequence is sent to the microprocessor 11 for interpretation as horizontal stroke</u>. In the same manner, for a top-down vertical stroke, the user moves his or her thumb across key1 and key2.

> [0028] The method presented here defines 6 fundamental strokes, namely "horizontal", "vertical", "slash", "back slash", "clockwise" and "counter-clockwise". <u>There now follows, with reference to FIGS. 2a-2f, a brief description of the six fundamental strokes and how they can be entered via sequence of keys</u>. In the following table (Table 1), "No." is a serial number for the fundamental strokes; "Type" is the name of the fundamental strokes; "Var" is the number of variations of thumb move paths; and <u>"Path" is the thumb move paths defined by the sequence of keys being visited</u>. (Emphases added).

As seen from the foregoing block quote, Wu does not have a step of queuing continuous path data because the only data input is the data generated when the switches are closed. Because Wu does not have a queue of continuous path data, Wu cannot search the queued continuous path data. And, as previously mentioned, because the only data that Wu receives is "corner data," there is no need to "generate a sequence of corner hits." The 35 U.S.C. § 102(b) rejection of claims 1, 33, and 38 as being anticipated by Wu should be withdrawn.

<u>Rejections Under § 103</u>

In paragraph 4 of the Office action, independent claims 17 and 56 stand rejected as being anticipated by Wu in view of Whitaker. Claims 17 and 56 have been amended to recite that a single unistroke define both the character and whether the character is upper or lower case. As discussed during the interview, Whitaker is not a unistroke system. Note, for example, the characters "l", "p", "s", among others. These characters cannot be defined in Whitaker by a single unistroke. It is not clear how the teachings of a non-unistroke system could be combined with the teachings of a unistroke system because the philosophies underlying each type of system are really incompatible.

Applicants also respectfully disagree with the examiner's characterization of Whitaker. The examiner states on page 7 of the Office action in rejecting claim 3 (which is the same rejection used for claim 17):

> The method of claim 2 additionally comprising identifying a letter character as being upper case when said stroke representative of

> said character ends in a common predetermined corner *(i.e. 66)* and lower case when said stroke does not end in said common predetermined corner *(i.e. 66)[fig. 6; col 4, ll. 18-40].*

Element 66 is not a corner. Element 66 is a light sensitive element. See figure 6 and column 5, lines 56-60. Next, strokes from the three o'clock position to the six o'clock position (or vice versa) result in upper-case letters while strokes from the nine o'clock position to the six o'clock position (or vice versa) result in lower-case letters. See figure 5 and the description in column 5, at lines 29-36 which provides:

> 3. The second character is a capital "T". <u>That it is a capital letter is indicated by the lower right line segment.</u> The upper three line segments as indicated from the code sheet represent in letters either a "t" or a "T".
>
> 4. <u>The third character is a lower case letter as indicated by the line segment at lower left.</u> The upper three segments from the code sheet are recognized as indicating an "h". (emphases added.)

It is clear from this example that it is the <u>line segment</u>, and not the <u>ending corner</u> (i.e., the six o'clock position) that determines if the character is upper or lower case.

Finally, the elimination of a separate stroke for capitalization is not a trivial change given communication today, particularly texting, where every key stroke is important. In the history of mobile text entry, the development of unistroke character entry, as opposed to multistroke character entry, is a significant advancement (Tappert, C. C. and Cha, S.-H. (2007) English language handwriting recognition interfaces. In Text Entry Systems: Mobility, Accessibility, Universality, I. S. MacKenzie and K. Tanaka-Ishii (eds). San Francisco: Morgan Kaufmann, pp. 123-138). For years, stylus input systems have tried to recognize human handwriting. The Apple Newton is one example. However, most of these efforts, the Newton included, fall short of their goal of recognizing handwritten text. One major algorithmic challenge with handwriting recognition is called "the segmentation problem," which is the problem of determining where one character stroke ends and another begins, i.e., determining which component strokes belong to which characters (Plamondon, R. and Privitera, C. M. (1999) The segmentation of cursive handwriting: An approach based on off-line recovery of the motor-temporal information. IEEE Transactions on Image Processing 8 (1), pp. 80-91). A second major problem in handwriting

recognition is that people often handwrite the same characters with different numbers of strokes. For example, some people may write an "H" with one, two, or three separate strokes. And even more variability occurs in the many stylistic variations in handwriting from different people.

The development of Unistrokes at Xerox PARC in the early 1990s addressed all of these problems (Goldberg, D. and Richardson, C. (1993) Touch-typing with a stylus. Proceedings of the ACM Conference on Human Factors in Computing Systems (INTERCHI '93). Amsterdam, The Netherlands (April 24-29, 1993). ACM Press, pp. 80-87). See also U.S. Patent No. 5,596,656. The key idea behind a unistroke is that a single stroke from pen-down to pen-up corresponds to a single character. This immediately solves the segmentation problem. It also solves the number-of-strokes variability problem (e.g., the "H" problem). It also reduces the variability of characters even among different writers, as unistrokes are defined to be made in one consistent way. Unistrokes also brought another benefit: because the pen is lifted between each character, they can be written on top of each other in a dedicated input area, with the recognized characters appearing elsewhere. This saves space, which is essential for use on small mobile devices. Before unistrokes, handwriting recognizers generally required people to write as they would on paper, taking up the same amount of space as paper and recognizing what was written in-place.

However, even with the breakthroughs brought about by unistrokes, capital letters remained effectively multistroke. On the Palm OS, which popularized unistroke systems such as Graffiti (Fleetwood, M. D., Byrne, M. D., Centgraf, P., Dudziak, K. Q., Lin, B. and Mogilev, D. (2002) An evaluation of text-entry in Palm OS—Graffiti and the virtual keyboard. Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting (HFES '02) Baltimore, Maryland (September 30-October 4, 2002) Human Factors and Ergonomics Society, pp. 617-621), every capital letter still required two separate strokes, one to set a capitalization mode and a second to make the letter. For multiple capitals in a row, a caps lock mode could be entered with two preface strokes. Given the prevalence of capital letters—at the start of all sentences, in proper nouns, titles, acronyms, and abbreviations—fully realizing the unistroke concept for all letters remained unsolved. It was left open how to incorporate the capitalization signal into the unistroke itself. In fact, this possibility was not even raised anywhere in literature prior to the present inventors demonstrating it (Wobbrock, J. O., Myers, B. A. and Kembel, J. A. (2003)

EdgeWrite: A stylus-based text entry method designed for high accuracy and stability of motion. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '03). Vancouver, British Columbia (November 2-5, 2003). ACM Press, pp. 61-70.)

The present invention solves the capitalization problem with a custom character set and a rule to go along with it: to capitalize any letter, the letter is made first and, without lifting, finished in a universal corner, e.g., the upper-left. In the present invention, no characters naturally end in the upper-left corner so utilizing that corner in this way is feasible. Note that unlike prior systems (e.g., Graffiti) that require the separate capitalization stroke before the character, the present invention allows the capitalization suffix to be appended after the character is made. This lessens the cognitive burden on users by allowing them to start each letter as they always would regardless of capitalization.

The present invention's capitalization innovation is non-obvious and important: it speeds up text entry, expands the unistroke concept to include mode-setting, and requires less visual feedback on a device because no temporary shift or caps lock mode identifier needs to be displayed. In the present invention, such a mode cannot be set; it simply exists as part of the unistroke character itself.

Rejection of Dependent Claims 13-16, 29-32, 50-53, and 66-69

In rejecting claims 13-16, 29-32, 50-53, and 66-69 the examiner relies upon Wu in combination with Donahey (US 3,996,557). The shortcomings of WU are discussed above. The citation to Donahey is believed to be incorrect. The discussion at the portion cited by the examiner (column 5, lines 20-30) relates to upper- and lower-case scripts, not to dynamically changing the size or shape of the corners defined by the confining geometric shape. Claims 13-16, 29-32, 50-53, and 66-69 are believed to be patentable independently of the patentability of their respective base claims.

During the interview, the examiner noted the possible relevance of U.S. Patent No. 4,477,797 to Nakagiri. Nakagiri is not believed to be any more relevant than the art already discussed. In Nakagiri, as discussed in the abstract:

> Data input is performed by tracing out patterns, each representing a character, numeral or symbol, such as to successively actuate a plurality of sensor elements, which can comprise touch-sensitive electrodes arrayed over a display device, and pattern recognition is performed by interpreting pairs of successive sensor element actuations as lines of an input pattern, rather than separately interpreting individual sensor element actuations as point inputs. (emphasis added)

The method of Nakagiri does not queue continuous path data, search the queued continuous path data to generate a sequence of corner hits, and does not identify a character based on the sequence of the corner hits independently of the remainder of the continuous path data.

Applicants at this time choose not to present arguments in favor of the patentability of the remaining dependent claims. Applicants' silence with respect to those claims should not be viewed as acquiescence in the Office's position. Applicants reserve the right to present arguments in favor of the patentability of any of the dependent claims at a later date should that become necessary.

Applicants have made a diligent effort to place the instant application in condition for allowance. Accordingly, a Notice of Allowance for pending claims 1-17, 20-36, and 38-71 is respectfully requested.

Respectfully submitted,

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